

M/035/003

SEEGMILLER INTERNATIONAL

MINING GEOTECHNICAL CONSULTANTS / ENGINEERS

143 South 400 East
Salt Lake City, Utah 84111 U.S.A.
Phone (801) 363-0606 Cable ROCKENGR

November 30, 1983

B. L. SEEGMILLER, Ph.D.
M. A. SEEGMILLER

Mr. Jay L. Murphy
Wasatch Boulevard & Canyon Cove Co.
Suite 190
5220 South 900 East
Salt Lake City, Utah 84107

REF: Canyon Cove Landslide
Stability Improvements

Dear Mr. Murphy:

Further to our telephone conversation of November 28, 1983 and my "Landslide Evaluation" report dated today, I would most strongly recommend that stability improvement measures be undertaken. Such measures would greatly add to the physical stability of the landslide, lessen the presently estimated probabilities of adversity and improve the safety relative to inhabitants of the Canyon Cove #2 Subdivision and their property.

The recommended stability improvement measures include: a groundwater depressurization system, the placement of a large berm in front of the landslide, slope grade modification and further displacement monitoring. At the present time I will just briefly describe these recommendations. Should you decide to implement any or all of them, I will be happy to present additional details.

The groundwater depressurization system would consist of 1½-inch diameter horizontal drains placed on three or four different levels in the lower portion of the landslide. Some 40 to 50 drains may be required. These drains would require no maintenance or power and would keep the groundwater pressurization to a minimum. The effluent water would be minimal after the first 30 days and could be channeled around and possibly to the south or north of the subdivision. The horizontal drains should prevent the buildup of any pressurization and effectively prevent further slope movement. Prior to placing the drains, the depth of the landslide should be more completely explored by drilling and the use of shear strips. Piezometers should also be placed. The cost of the drains depends on the number required. The number required will depend on the actual ground-

Mr. Jay L. Murphy
Page 2
November 30, 1983

water pressurization levels (they would be determined by piezometers), the extent of the unstable mass (it would be determined by further drilling) and by the actual depth of the landslide (it would be determined with shear strips). Once the detailed exploratory field work has been completed, an accurate cost estimate for depressurization can be made.

The second recommendation is to place a berm in front of the toe of the landslide. Such a berm would catch most of the loose landslide debris, if a catastrophic slope failure should occur. The berm could be placed at any convenient time. The height of the berm and its exact positioning will require further study.

*this
needs
further
elaboration*

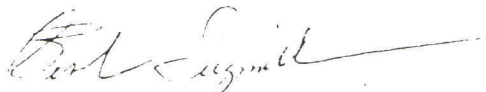
The third recommendation would involve a complete regrading of the landslide area such that the landslide geometry is greatly modified. Such regrading would eliminate the tension cracks, but would require substantial earth moving to fully eliminate the basal shear plane or planes. Further study would be required to accurately assess the volumes of earth to be moved and the associated costs.

The last recommendation is to continue displacement monitoring of the points placed by the Salt Lake County Public Works Department (i.e. Mr. Roy Baty). Some movements are highly probable in the next 6 to 8 months and a permanent record of them would be most helpful for the proper design and layout of any remedial measures such as those recommended above.

I again urge you to carefully consider my stability improvement recommendations in light of the fact that we are dealing with potential human fatalities and extensive property damage. Please call me if you have any questions.

Sincerely yours,

SEEGMILLER INTERNATIONAL



Dr. Ben L. Seegmiller, P.E.
Principal Consultant

BLS/mas